

UPPER TRISHULI-1 HEP (216MW)			
Client	Doosan Heavy Industries & Construction		
DHI’s Subcontractor	Power Construction Corporation of China		
REPLY COMMENT			
Subcontractor	Power Construction Corporation of China		
Incoming Document			
Title of the Document	Excavation and Initial Support Drawings of Investigation Tunnel for Powerhouse		
Document/Drawing No.	UT1-C-385-CVL-DG-65002-01 to 04	Revision	A
Review Document No.	TJ/UT1/OUT-12	Reviewed Note No.	RN-0053
Received Date	04.02.2022	Review status	AN
Outgoing Document			
Previous Reply No.	XXX	Previous Reply Date.	31.01.2022 2
Reply No.	RC-000X	Reply date	04.06.2022 2

General Comments

Most of previous comments of the reviewer were considered and were indicated in the drawings. Only some technical comments remained. There are several other comments, which refer to formalities, only.

The drawings are marked and commented.

Drawing UT1-C-385-CVL-DG-65002-01, Rev. D

TUNNEL SUPPORT PATTERNS						
Rock mass quality	40Q	H2Q-40	4Q-10	1Q-4		Q-1
Q value of rock mass quality for calculation	40	25	7	2.5		0.5
Support type	I	II	III	IV		V
Rock dimension(m)	Width: 2m, Height: 4m					
Excavation Parameter						
ESR	1.3	1.3	1.3	1.3		1.3
Excavation speed(m)	3	3	2	1.5		0.5-1
Calculated MUSH(m)	11	9	5	3		1
MUSH for shotcrete application(m)		9	2	1.5		1
MUSH for rock dowsel installation(m)		6	4	3.0		0.5-1
MUSH for steel support installation(m)						0.5-1
Excavation method	Blasting			Blasting/mechanically		Mechanically
Initial support parameters						
where necessary						
Wisp hole, Φ60mm, L=0.5m						
Max. buried depth, H	H≤305	H≤305	200-H≤305	H≤200	150-H≤200	H≤100
Plastic fiber shotcrete, f=25MPa	Spot	Spot	Spot	Spot	Spot	Spot
Rock dowsel, D25, L=3m, alternately	Spot	@2.5m x 2.5m (roof) Spot in tunnel wall	@2m x 2m	@1m x 1m	@1.5m x 1.5m	@1.5m x 1.5m
Steel support, MB150 (or lattice girder)				@1m		
For grouting grout dowsel, D25mm, Φ400mm, L=1m						
where necessary						
For class V rock, rock can be shotcreting and to improve its integrity and strength.						
where as class IV shotcrete can class IV shotcrete can be used to improve its strength.						

a) Support should not be specified according to overburden thickness. Delete this row.

Reply This row has been deleted.

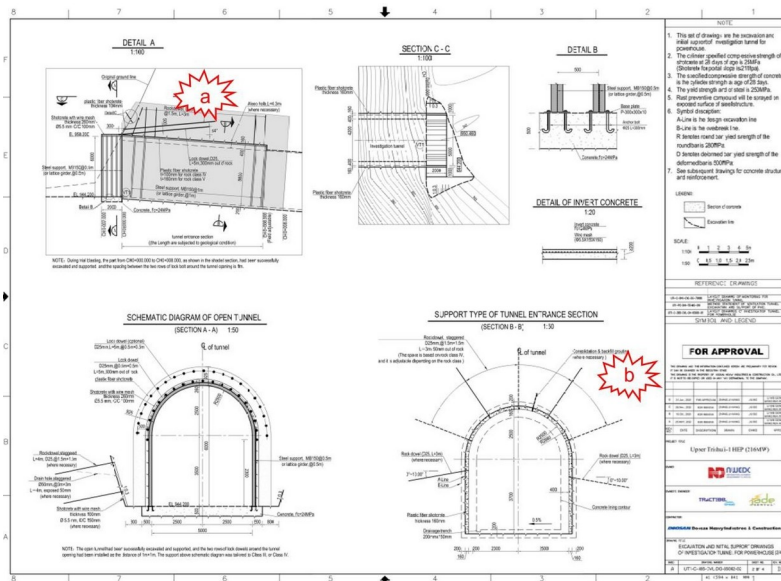
b) There should be one thickness of shotcrete in Class IV. Use 120 mm, C25.

Reply This item has been modified by referring to similar file, i.e.: UT1-C-090-CVL-DG-64002-01 to 06 EXCAVATION AND SUPPORT OF ACCESS TUNNEL TO POWERHOUSE.

c) Specify clearly the support for Class V. Shotcrete thickness 160 mm, C25.

Reply This item has been modified by referring to similar file, i.e.: UT1-C-090-CVL-DG-64002-01 to 06 EXCAVATION AND SUPPORT OF ACCESS TUNNEL TO POWERHOUSE.

Drawing UT1-C-385-CVL-DG-65002-02, Rev. D



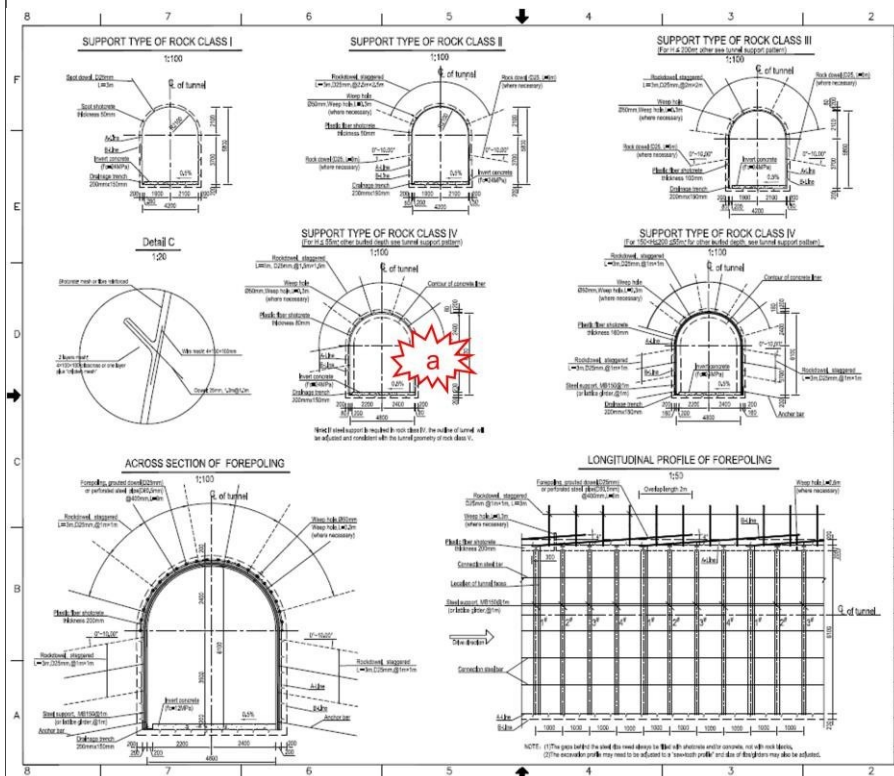
a) Angle between tunnel axis and dowels is 4°, not between horizontal and dowels.

Reply The angle has been modified int the drawing.

b) Add to the sentence "This drawing... ..in the execution stage, with written approval of the OE." This refers, of course, to all other drawings in this series.

Reply The sentence has been added to below the section.

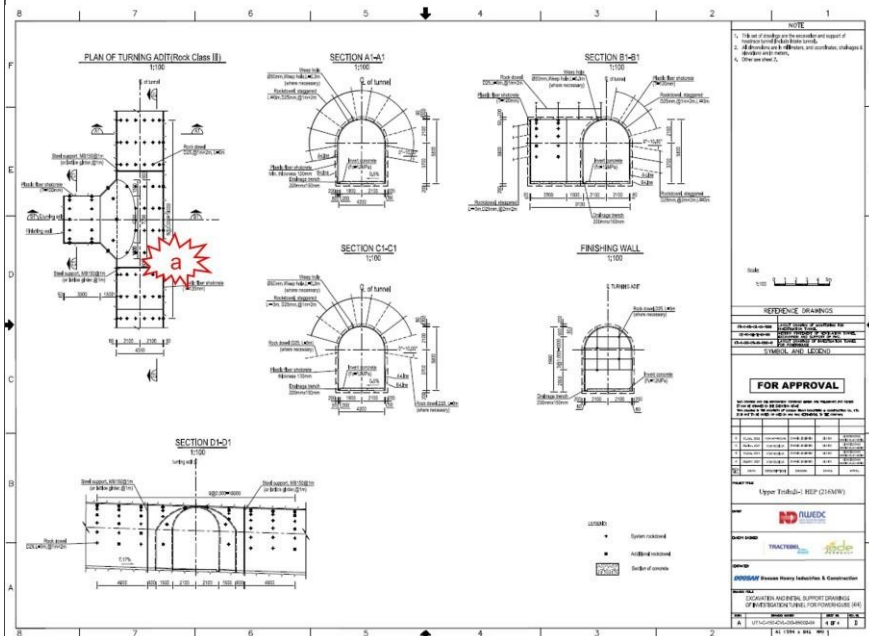
Drawing UT1-C-385-CVL-DG-65002-03, Rev. D



a) Do not connect the support type with overburden thickness. Use one thickness in Class IV (120 mm, C25).

Reply□This item has been modified by referring to similar file, i.e.: UT1-C-090-CVL-DG-64002-01 to 06 EXCAVATION AND SUPPORT OF ACCESS TUNNEL TO POWERHOUSE.

Drawing UT1-C-385-CVL-DG-65002-04, Rev. D



a) Clearly indicate in which area the shotcrete thickness in the junction is 120 mm in Class III.

Reply□The area with the thickness of 120mm in class III has been indicated in the drawing No. UT1-C-150-CVL-DG-65002-04.